

REMARKS

This paper is filed in response to the Office Action mailed on September 16, 2003. Claims 1-11 are pending. Claims 1-11 have been examined and stand rejected. Reconsideration of Claims 1-11 is respectfully requested.

Applicants thank Examiner Alvo for the courtesy shown during a telephone interview on November 18, 2003. In accordance with that conversation, this amendment and remarks are being submitted.

The Rejection of Claims 1-11 Under 35 U.S.C. § 103(a)

Claims 1-11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Gannon et al. (U.S. Patent No. 6,042,769) in view of WO 99/16960, and Samuelson et al. (U.S. Patent No. 5,985,097) with or without Luo et al. (U.S. Patent No. 6,201,801).

As to the presently amended claims, applicants respectfully traverse the rejection for the following reasons.

The Examiner states that "Gannon et al fairly disclose a process for making lyocell fibers comprising the steps of: (a) contacting an alkaline pulp comprising cellulose and hemicellulose under alkaline condition with an amount of oxidant (hydrogen peroxide or ozone) sufficient to reduce the average degree of polymerization of the cellulose to the range of from about 200 to about 1100 and (b) forming the fibers from the pulp treated in accordance with step (a).... Gannon et al teaches the claimed invention except for the limitation of of [sic] without substantially reducing the hemicellulose content of the pulp or substantially increasing the copper number."

The Examiner states that "Samuelson et al teaches that the catalysation of the depolymerization of cellulose and hemicellulose during peroxide bleaching can be controlled by

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monitoring and controlling the ratio of transition metals and Mg in the pulp.... It would have been obvious to prevent the degradation of the hemicellulose and cellulose in the cellulosic material of Gannon et al. by adding the proper amount of Mg as taught by Samuelson et al."

The Examiner states that "WO 99/16960 teaches that alkaline pulp, e.g. kraft pulp treated with sodium hydroxide, is particularly useful in the manufacture of lyocell (sic). It would have been *prima facie* obvious from the teachings of WO 99/16960 to use alkaline kraft pulp as the fiber of Gannon et al. ... The kraft pulp of WO 99/16960 is the same pulp used by Applicant and would have the same hemicellulose content as the instant pulp."

The Examiner states that "Luo teaches decreasing the copper number by treating pulp with sodium borohydride. If necessary, it would have been obvious to prevent an increase in the copper number by treating the lyocell with sodium borohydride to decrease the copper number as taught by Luo et al."

For a *prima facie* case of obviousness, there must be a suggestion or motivation either in the references or in the knowledge generally available to modify a reference or to combine references. There must be a reasonable expectation of success, and all the elements must be found in the prior art references. The suggestion or motivation to modify references or to combine references must not be taken from the applicants' disclosure. There are several reasons why the claims are not obvious over Gannon et al. in view of Samuelson et al.

All the elements are not found in the references. As now amended, Claim 1 recites "contacting an alkaline pulp comprising non-regenerated cellulose." "Non-regenerated cellulose" refers to cellulose that has not been obtained after dissolution in a solvent. The amendment is supported throughout the specification. For example, please refer to the Background section and page 24, lines 8-9. See also *Webster's Ninth New Collegiate Dictionary*, Merriam-Webster Inc., publs., p. 991, "regenerated cellulose" means "cellulose obtained in a

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changed form by chemical treatment (as of a cellulose solution or derivative)." As shown by FIGURES 1A through 1C, an alkaline pulp having gone through the DP reduction process according to the invention occurs prior to lyocell molded body formation including dissolution in a solvent, and regeneration into lyocell fibers.

In direct contrast to Claim 1, the Gannon et al. reference describes dissolving cellulose in a solvent, extruding the solution, and washing the extruded filaments, thereby forming lyocell fibers of regenerated cellulose, before reducing the degree of polymerization of the cellulose in lyocell fibers. The Gannon et al. reference does not remotely teach or suggest reducing the D.P. of non-regenerated cellulose. Accordingly, for this reason alone, Claim 1 is clearly patentable.

There is no reasonable expectation of successfully producing the claimed invention by combining Samuelson et al. with Gannon et al. The Examiner is arguing that adding Mg in the proper amounts prevents the degradation of cellulose and hemicellulose. The invention defined by Claim 1 recites "to reduce the degree of polymerization of the cellulose . . . without substantially reducing the hemicellulose content of the pulp." Accordingly, if the Examiner is correct in asserting that the addition of Mg prevents degradation of cellulose and hemicellulose, the proposed addition of Mg would also prevent the degradation of cellulose, which is contrary to Claim 1. Thus, it is unreasonable to expect to successfully recreate the invention of Claim 1 by adding Mg to the process of Gannon et al.

There is no suggestion or motivation to combine references. Gannon et al. is directed to a method for reducing the degree of polymerization of cellulose in lyocell fibers to reduce the fibrillation of the fibers. The process occurs after the dissolution, extrusion, and regeneration steps. Samuelson et al. is directed to a method that avoids the detrimental effects that occur during the delignification (bleaching) of pulp. Delignification of pulp occurs prior to dissolving

the pulp for any extrusion process. Thus, Samuelson et al. is directed to a process that is neither subject matter nor temporally relevant to the process described by Gannon et al.

Furthermore, the prior art teaches against the combination. Gannon et al. teaches intentionally reducing the degree of polymerization of cellulose to reduce the fibrillation of lyocell fibers. A reduction of the degree of polymerization is tantamount to a reduction in the viscosity. The objective of Samuelson et al. is to prevent the decrease in cellulose viscosity caused by oxygen bleaching. Therefore, Gannon et al. purposely degrades the cellulose; while Samuelson et al. prevents degrading cellulose. The teachings of the references are in direct contrast with each other.

The Examiner further states that "since the copper number is directly related to the cellulose degradation . . . it would have been obvious that preventing cellulose degradation by adding Mg to the pulp during peroxide bleaching as taught by Gannon et al, would prevent an increase in the copper number." Applicants are obliged to correct what appears to be a misinterpretation of applicants' disclosure by the Examiner. Copper number more accurately directly correlates to the number of reducing groups on cellulose molecules. Generally speaking, conventional degradation of cellulose will produce more reducing groups at the locations where the cellulose molecules are cleaved. However, the method of Claim 1 achieves a reduction of the degree of polymerization of cellulose without a substantial increase in copper number, i.e., without a substantial increase in reducing groups.

The Rejection of Claims 1-11 Under 35 U.S.C. § 112, Second Paragraph

Claims 1-11 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention.

Applicants respectfully traverse the rejection for the following reasons.

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The Examiner states that "[t]he term 'without substantial increasing of the copper number,' when read in view of the specification includes increases up to 100%. A doubling of the copper number is a substantial increase in copper number. Thus, the term is indefinite."

The Examiner further states that despite applicants' definition, "the definitions must be within that conventionally used in the art. The art would not recognize a doubling of copper number to be 'without substantial increasing'."

In concluding that the term is indefinite, the Examiner is relying on his subjective opinion that a doubling of the copper number is a substantial increase.

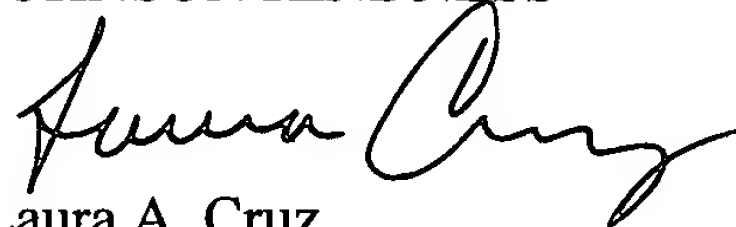
Applicants believe the meaning of the phrase is not indefinite because the meaning of "substantial increase" is clearly and unambiguously provided in the disclosure; one of ordinary skill in the art would be appraised of the scope of the claim by reading the disclosure.

CONCLUSION

In view of the foregoing amendments and remarks, applicants respectfully submit that Claims 1-11 are allowable. If the Examiner has any further questions, the Examiner is invited to contact the applicants' attorney at the number provided below.

Respectfully submitted,

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